U.S. Department of Energy
Office of River Protection
P.O. Box 450
Richland, Washington 99352

03-OSR-0395

Mr. J. P. Henschel, Project Director
Bechtel National, Inc.
2435 Stevens Center
Richland, Washington 99352

Dear Mr. Henschel:

CONTRACT NO. DE-AC27-01RV14136 – APPROVAL OF BECHTEL NATIONAL, INC. (BNI) AUTHORIZATION BASIS APPROVAL REQUEST (ABAR) 24590-WTP-SE-ENS-03-308, REVISION 0, AND ABAR 24590-WTP-SE-ENS-03-378, REVISION 1

References:

1. BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-308, Revision 0, 'Modification to Cesium Ion Exchange Process: Integration of Cesium Ion Exchange Columns with Gas Separation Vessels'," CCN: 066505, dated September 4, 2003.

2. BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-378, Revision 0, 'Process Flow Diagram: Cesium Resin Addition Process System (CRP)'," CCN: 066507, dated September 5, 2003.

3. BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Re-Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-378, Revision 1, 'Process Flow Diagram: Cesium Resin Addition Process System (CRP)'," CCN: 070434, dated October 13, 2003.

This letter approves ABAR 24590-WTP-SE-ENS-03-308, Revision 0, and ABAR 24590-WTP-SE-ENS-03-378, Revision 1, based on the information provided in the References and the attached Safety Evaluation Reports (SER). The U.S. Department of Energy, Office of River Protection (ORP) has found the changes acceptable, and has concluded there is reasonable assurance the health and safety of the public, the workers, and the environment will not be affected adversely by those changes, and that they comply with applicable laws, regulations, and River Protection Project Waste Treatment and Immobilization Plant contractual requirements. Attached is the SER for the proposed changes.

The approval is subject to BNI making the modifications discussed in the attached SERs. It was necessary to modify BNI's original proposal because in several instances the submittal did not remove all references to equipment deleted by the proposed amendment request. BNI staff has reviewed these changes and has agreed with them. Additionally, ORP found several instances where the proposed changes to the Preliminary Safety Analysis Report (PSAR)

provided with ABAR 24590-WTP-SE-ENS-03-308 were related to design changes as described in ABAR 24590-WTP-SE-ENS-03-378, and conversely, not all necessary changes to the PSAR were identified in ABAR 24590-WTP-SE-ENS-03-378. However, changes that were absent from ABAR 24590-WTP-SE-ENS-03-378 were included in ABAR 24590-WTP-SE-ENS-03-308. Therefore, this is an approval of both ABAR 24590-WTP-SE-ENS-03-308 and ABAR 24590-WTP-SE-ENS-03-378.

This amendment is effective immediately and shall be fully implemented within 30 days; i.e., the provisions of the amendment may be used immediately; within 30 days, controlled copies of subordinate documents must be modified to reflect the changes associated with this amendment.

If you have any questions, please contact me, or your staff may contact Walter Pasciak, Waste Treatment and Immobilization Plant, Safety Regulation Division, (509) 373-9189.

Sincerely,

Roy J. Schepens
Manager

OSR:PPC

Attachments
1. SER for ABAR 24590-WTP-SE-ENS-03- 308
2. SER for ABAR 24590-WTP-SE-ENS-03- 378

**Safety Evaluation Report (SER)
of Proposed Authorization Basis Amendment Request (ABAR)
24590-WTP-SE-ENS-03-308, Revision 0
Modification to Cesium Ion Exchange Process:
Integration of Cesium Ion Exchange Columns with Gas Separation Vessels
for the River Protection Project Waste Treatment and Immobilization Plant (WTP)**

1.0 INTRODUCTION

This SER documents the U.S. Department of Energy, Office of River Protection (ORP) evaluation of changes proposed by Bechtel National, Inc. (the Contractor) concerning revisions to the Cesium Ion Exchange Process. By letter dated September 4, 2003, the Contractor submitted changes that proposed to delete the Cesium Ion Exchange Gas Separation Vessels and to modify the Cesium Ion Exchange Columns, and to eliminate the compressed air bottles as a redundant source of air supply for purging the ion exchange columns.

Specifically, the ABAR proposes the following:

1. Deletion of the Gas Separation Vessels and integration of the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4) with the function previously provided by the Gas Separation Vessels (CXP-VSL-00021/22/23/24);

2. Deletion of Compressed air bottles as a redundant source of air supply to purge the Cesium Ion Exchange columns; and

3. Addition of instrumentation and controls for the Ion Exchange Columns to assure conformance to single failure criteria:
   a. Added column resin temperature indication to monitor column resin temperature to provide backup indication for potential heating of the column;
   b. Added column inlet/outlet isolation valves requirement to fail close on column low level indication;
   c. Added purge air system default to low pressure on column low level indication to prevent column pressurization that may impede the emergency elution function; and
   d. Added redundant purge air exhaust pathway.

2.0 BACKGROUND

The WTP authorization basis is the composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which ORP grants permission to perform regulated activities. The authorization basis includes that information requested by the Contractor for inclusion in the authorization basis and subsequently accepted by ORP. The Preliminary Safety Analysis Report (PSAR) describes the analyzed safety basis for those facilities (safety envelope), demonstrates that the facility will perform and be operated such that the radiological, nuclear, and process safety requirements are met, and demonstrates adequate protection of the public, workers, and environment.

The PSAR is based on the preliminary design of the facilities and is part of the authorization basis for WTP construction. ORP authorized construction of the Pretreatment Facility (PTF) based on the facility safety basis documented in the PSAR. By letter number CCN 066505, the Contractor submitted a proposed amendment that required changes to the PTF PSAR. This SER documents ORP's evaluation of the changes proposed in ABAR 24590-WTP-SE-ENS-03-308, Revision 0, Modification to Cesium Ion Exchange Process: Integration of Cesium Ion Exchange Columns With Gas Separation Vessels.

3.0 EVALUATION

The following subsections outline specific changes to the PSAR with respect to deletion of the Cesium Ion Exchange Gas Separation Vessels and to modify the Cesium Ion Exchange Columns, and to eliminate the compressed air bottles as a redundant source of air supply for purging the ion exchange columns. The reviewers evaluated PTF PSAR Sections 2.5.6, 2.5.6.2, 2.7.1, 3.3.3.2.4, 3.4.1.7, 3.4.1.8, 3.4.2.1, Table 3A-8, Table 3A-13, Table 3A-28, Section 4.3.3, 4.3.4, 4.3.9, Table 4A-1, Section 5.5.6, and 5.5.9, and the Contractor responses to PTF PSAR Questions PT-PSAR-003, PT-PSAR-005, PT-PSAR-023, PT-PSAR-024, PT-PSAR-038, PT-PSAR, 099, PT-PSAR-110, PT-PSAR-143, PT-PSAR-144, PT-PSAR-178, PT-PSAR-199, PT-PSAR-242, PT-PSAR-243, PT-PSAR-258, and PT-PSAR-284, and for the changes proposed by ABAR 24590-WTP-SE-ENS-03-308.

3.1 Proposed Changes to PTF PSAR Volume II

The following subsections outline specific changes to the PTF PSAR Specific Information with respect to changes to the Cesium Ion Exchange Process System.

Deletion of the Gas Separation Vessels and Integration of the Cesium Ion Exchange Columns (CXP-IXC-00001/2/3/4) with the Gas Separation Vessels (CXP-VSL-00021/22/23/24):

In the proposed design, the GSV's have been eliminated and hydrogen removal is performed in a similarly sized gas volume integral to the ion exchange column.

Evaluation:

In the previous design, the air purge was supplied and vented from the Ion Exchange Columns via a separate Gas Separation Vessels (GSV). The GSVs were determined to be inadequate to completely purge the columns. The proposed design eliminates the GSVs, however, the new design allows for purging directly into the vapor space of the Ion Exchange (IX) column and the safety function to purge hydrogen gas is still maintained. The proposed design does not create any new hazards or adversely affect any hazards currently identified in the PSAR. No new design bases events (DBE) are created by this change as well. The new design will continue to meet SRD Safety Criteria 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.3-3, and 4.3-4, including their implementing codes and standards.

Deletion of Compressed Air Bottles as a Redundant Source of Air Supply:

The compressed air bottles that supported the Cesium (Cs) IX Gas Separation Vessels as a redundant source of air supply are being deleted.

Evaluation:

The compressed air bottles are no longer required. Previously the air bottles were required in the event of a station blackout, which was considered a DBE. ABC 24590-WTP-ESH-02-019 removed the requirements to use target frequencies for the selection and confirmation of control strategies. As a result of this approved ABCN, station blackout is no longer considered a DBE. As part of the existing authorization basis, redundant ITS air compressors powered by emergency power and uninterruptible power supply (UPS) backed control systems will be available. This change is acceptable because it does not create a new DBE or adversely affect DBEs currently identified in the PSAR. The air compressors, piping, and valves are SDC and SC-I. The new design will continue to meet SRD Safety Criteria 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.3-3, and 4.3-4, including their implementing codes and standards.

Addition of Instrumentation and Controls for the Ion Exchange Columns:

New instrumentation and controls have been added to the system to satisfy SRD requirements for single failure criteria by adding a diverse column resin temperature interlocks so that in the event of high temperature in the column, the temperature interlocks would automatically initiate the emergency elution system (in addition to the existing low liquid level actuation). Column level instrumentation and controls are available as well that will initiate the emergency elution system upon low liquid level in the column. Additionally, the requirement for IX column feed pump discharge valve to fail close on low-level indication was added in order to isolate the feed to the column during emergency elution. Another new interlock was added namely, an interlock to close the isolation valve from the fresh resin tank on initiation of the emergency elution system to prevent resin addition during the elution process. The purge air system was modified to operate at a lower pressure on low-level indication to prevent column pressurization that may impede the emergency elution function, and finally, a redundant purge air exhaust pathway was added in order to meet single failure requirements. The purge air and exhaust systems control hydrogen concentration below the lower flammability level (LFL) in the IX column head space. Given the potential severity of the hydrogen burn event, the active components of the purge air and exhaust system are required to be redundant.

Evaluation:

These changes are acceptable because the new instrumentation and controls will not create a new DBE, and will not increase the consequence of currently analyzed DBEs related to the Cesium Ion Exchange system. Two physical barriers are provided by the design; the IX column shell and isolation valves, and the C5 confinement system. The current design for the purge air system supplies air in the IX vapor space at a pressure that matches the process feed pump discharge pressure. The proposed purge air system design change would reduce the supplied air pressure to the IX vapor space upon low

level being detected in the IX column. The revised purge air system configuration is acceptable because it maintains the minimum airflow requirement to assure a safe hydrogen concentration consistent with DBE calculation 24590-PTF-Z0C-W14T-00026. These changes support the currently analyzed DBEs for resin dry-out and overheating with the risk of a resin fire, and hydrogen accumulation in the IX column. The emergency elution system will be automatically activated if the temperature in any column reaches a predefined set-point, or if column liquid level drops below a predefined set-point or on loss of temperature or liquid level signals from a column for a predetermined period of time. The Cs IX column liquid level protection system and temperature control system, backed up by UPS power supply, meets single failure criteria in order to insure the credited safety function of the emergency elution system. The new instrumentation and controls are designated SDC and SC-I, and meets SRD Safety Criteria 4.1-2, 4.1-4, 4.3-1 through 4.3-5, 4.4-1, 4.4-2, 4.4-3, and 4.4-4.

3.1.1 Proposed Changes to PSAR Volume II, Section 2.5.6, Cesium Ion Exchange Process System (CXP)

Section 2.5.6, (Page 2-42, Paragraph 4) currently states:

> "Other equipment includes two vessels for receipt and transfer of the caustic rinse (CXP-VSL-00004/5) used during the resin elution and four gas separation vessels (GSV) (CXP-VSL-00021 through 00024) (one per IX column). Related equipment includes the emergency cooling source vessels (DIW-TK-00001 and SHR-TK-00005) which maintain a minimum heel to provide emergency cooling supply for the IX system."

The proposed amendment would change the text to read:

> "Other equipment includes two vessels for receipt and transfer of the caustic rinse (CXP-VSL-00004/5) used during the resin elution. Related equipment includes the emergency cooling source vessels (DIW-TK-00001 and SHR-TK-00005) which maintain a minimum heel to provide emergency cooling supply for the IX system."

Evaluation (acceptable): The proposed design change deletes the Cesium Ion Exchange Gas Separation Vessels and the hydrogen removal is now performed in a similarly sized gas volume in the Cesium Ion Exchange Columns. The two physical barriers, namely the IX column and the C5 confinement system are still present as required. The change as described will continue to meet SRD Safety Criteria 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.3-3, and 4.3-4, including their implementing codes and standards.

The proposed changes to section PSAR Section 2.5.6 are acceptable because they are consistent with the design change as described and evaluated in Section 3.1 above.

3.1.2 Proposed Changes to PSAR Volume II, Section 2.5.6.2, Cesium Ion Exchange Column (CXP-IXC-00001/2/3/4)

Section 2.5.6.2 (Page 2-44, Paragraph 7 and 8) currently states:

> "Each column is equipped with temperature and level monitoring systems. The temperature monitoring system provides an alarm in the MCR that indicates abnormal Cs IX resin temperatures. The column level monitoring system provides interlocks that initiate actions based on the mode of operation, which may include tripping the feed pumps, shutting the outlet isolation valves to the column, opening inlet valves to the column, and opening the purge air dump valves on the GSV (section 4.3.9). In addition, personnel may initiate cooling of the column(s) via the emergency cooling system.
>
> Hydrogen gas evolved in the Cs IX columns is directed to a hydraulically connected vapor space vessel (GSV) where the hydrogen is purged into the PVV system. Each column is supplied with a jacket cooler supplied by CHW to ensure efficient cesium removal. See Figure 2A-34."

The proposed amendment would change the text as found in new Paragraph 2.5.6.2 to read:

> "Each column is equipped with temperature and level monitoring systems. These monitoring systems provide an alarm in the MCR and provide interlocks that initiate actions based on the mode of operation, which may include tripping the feed pumps and shutting the isolation valves to the columns (section 4.3.9).
>
> Hydrogen gas evolved in the Cs IX columns is purged into the PVV system. Each column is supplied with a jacket cooler supplied by CHW to ensure efficient cesium removal. See Figure 2A-34."

Evaluation (acceptable): The proposed design change deletes the Cesium Ion Exchange Gas Separation Vessels, modifies the Cesium Ion Exchange Columns, and adds instrumentation and controls to satisfy SRD requirements for single failure configuration. The change as described will continue to meet SRD Safety Criteria 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.3-3, and 4.3-4, including their implementing codes and standards.

The proposed changes to new PSAR Section 2.5.6.2 are acceptable because they are consistent with the design change as described and evaluated in Section 3.1.

3.1.3 Proposed Changes to PSAR Volume II, Section 2.7.1 Hydrogen Mitigation Systems

Section 2.7.1 (Page 2-70, Paragraph 3) currently states:

> "Upon loss of normal process air or loss of offsite power, the purge air and the air to drive the PJMs will be supplied by redundant ITS air compressors and UPS-backed control systems. When pressure instrumentation senses low air receiver pressure, a start signal will be sent to the backup compressors. The compressed air bottles float on the air supply system and will supply air to the receivers if the pressure supplied by the backup compressors drops below a predetermined value."

The proposed amendment would change the text to read:

"Upon loss of normal process air or loss of offsite power, the purge air and the air to drive the PJMs will be supplied by redundant ITS air compressors and UPS-backed control systems. When pressure instrumentation senses low air receiver pressure, a start signal will be sent to the backup compressors."

Evaluation (acceptable): The proposed design change eliminates the compressed air bottles as a redundant source of air supply for purging the ion exchange columns. Redundant ITS air compressors powered by emergency power and uninterruptible power supply (UPS) backed control systems will be available. This change is acceptable because it will not create a new DBE, and will not increase the consequence of currently analyzed DBEs.

The change as described will continue to meet SRD Safety Criteria 4.2-1, 4.2-2, 4.3-1, 4.3-2, 4.3-3, and 4.3-4, including their implementing codes and standards.

The proposed changes to new PSAR Section 2.7.1 are acceptable because they are consistent with the design change as described and evaluated in Section 3.1.

3.1.4 Proposed Changes to PSAR Volume II, Section 3.3.3.2.4 Control Strategies:

Section 3.3.3.2.4 (Page 3-12, third and fourth bullet) currently states:

- "Explosions - Dual-step HNO_3 dilution process; stopping reagent flow when the chemical concentration set-point is exceeded; vessel contents verified within specification before reagent transfer; interlock for opening the alternate purge air supply valve; interlock for opening the evaporator vent valve; primary confinement components designed for worst-case service and seismic conditions.

- Fire - Gas separation vessels instrumented with level detection; temperature indication; internal column level detection; and emergency elution."

The proposed amendment would change the text to read:

- "Explosions – Level instrument reverts lead column to safe state on low liquid level; dual-step HNO_3 dilution process; stopping reagent flow when the chemical concentration set-point is exceeded; vessel contents verified within specification before reagent transfer; primary confinement components designed for worst-case service and seismic conditions.

- Fire - Columns instrumented with level detection; resin temperature monitors; internal column level detection; and emergency elution."

Evaluation (conditionally acceptable): This change to the PSAR is acceptable contingent on BNI revising the above text as noted below.

- "Explosions – Level instrument reverts lead column to safe state on low liquid level; dual-step HNO_3 dilution process; stopping reagent flow when the chemical concentration set-point is exceeded; vessel contents verified within specification before reagent transfer; primary confinement components designed for worst-case service and seismic conditions,

interlock for opening the alternate purge air supply valve, and interlock for opening the evaporator vent valve.

- Fire - Columns instrumented with level detection; resin temperature monitors; internal column level detection; and emergency elution."

The amendment as revised is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.5 Proposed Changes to PSAR Volume II, Section 3.4.1.7 Cesium Ion Exchange Column Events:

Section 3.4.1.7 (Page 3.4.1.7-1, last bullet) currently states:

- "Liquid level control failure – failure of liquid feed combined with continued pressurized purge air flow through the column gas separation vessel (loss of level control), causing liquid to be blown out of the column (3.4.1.7.3)."

The proposed amendment would change the text to read:

- "Liquid level control failure – failure of liquid feed combined with continued pressurized purge air flow through the column (loss of level control), causing liquid to be blown out of the column (3.4.1.7.3)."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.6 Proposed Changes to PSAR Volume II, Section 3.4.1.7.1.2 Mitigated DBE Scenario:

Section 3.4.1.7.1.2 (Page 3.4.1.7-2, first bullet) currently states:

- "Provide automatic elution/cooling/makeup capability (SCR-QSERV/N0003).

The proposed amendment would change the text to read:

- "Provide automatic elution capability (SCR-QSERV/N0003)."

Evaluation (acceptable): This change to the PSAR is acceptable because the automatic elution system provides for elution, cooling, and makeup and implements the design change as described and evaluated in Section 3.1.

Section 3.4.1.7.1.2 (Page 3.4.1.7-3, Item 2) currently states:

"2. Accident Progression 2: Pre-existing leak, column shutdown for an extended time, leak detected, but emergency cooling or heat removal not accomplished due to failure of automatic caustic/water addition system."

The proposed amendment would change the text to read:

> "2. Accident Progression 2: Pre-existing leak, column shutdown for an extended time, leak detected, but emergency cooling or heat removal not accomplished due to failure of emergency elution system."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in ABAR 24590-WTP-ABAR-ENS-03-378.

Section 3.4.1.7.1.2 (Page 3.4.1.7-3, last paragraph) currently states in part:

> "Accident Progression 2 assumes the leak is detected on column shutdown. Both the normal elution and automatic caustic/water addition systems are available for mitigating the accident on detection of the leak. The failure rate of the normal elution system is set at 10 times the SIL-2 rate (ISA-S84.01, *Standard-Application of Safety Instrumented Systems for the Process Industries*), as the normal elution system is non-ITS. This failure rate is judged to account for human error to elute within 30 hr. For overheating to occur, the automatic caustic/water addition system must also fail. Thus, the SIL-2 failure rate is used for this ITS system."

The proposed amendment would change the text to read:

> "Accident Progression 2 assumes the leak is detected on column shutdown. Both the emergency elution systems are available for mitigating the accident on detection of the leak. The failure rate of the normal elution system is set at 10 times the SIL-2 rate (ISA-S84.01, *Standard-Application of Safety Instrumented Systems for the Process Industries*), as the normal elution system is non-ITS. This failure rate is judged to account for human error to elute within 30 hr. For overheating to occur, the emergency elution system must also fail. Thus, the SIL-2 failure rate is used for this ITS system."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.7 Proposed Changes to PSAR Volume II, Section 3.4.1.7.1.5 Final Control Strategy Selection:

Section 3.4.1.7.1.5 (Page 3.4.1.7-4) currently states:

> "The ITS SSCs credited for preventing the occurrence of resin overheating are
>
> - The IX columns are designed to high standards to minimize the likelihood of a leak that could induce resin media dry-out
> - IX column level detection system
> - Automatic caustic/water addition system"

The proposed amendment would change the text to read:

"The ITS SSCs credited for preventing the occurrence of resin overheating are

- The IX columns are designed to high standards to minimize the likelihood of a leak that could induce resin media dry-out
- IX column level detection system
- IX column resin temperature monitor
- Emergency Elution System."

Evaluation (conditionally acceptable): This change to the PSAR is acceptable contingent on BNI revising the above text as noted below.

"The ITS SSCs credited for preventing the occurrence of resin overheating are

- The IX columns are designed to high standards to minimize the likelihood of a leak that could induce resin media dry-out
- IX column level detection system
- IX column resin temperature monitor and interlock
- Emergency Elution System."

The amendment as revised is acceptable because it implements the design change as described and evaluated in Section 3.1. The resin temperature monitor provides temperature indication in the main control room to assist the operators, and a temperature interlock will initiate the emergency elution system on a predetermined high temperature set-point.

3.1.8 Proposed Changes to PSAR Volume II, Section 3.4.1.7.1.6 Defense in Depth Items:

Section 3.4.1.7.1.6 (Page 3.4.1.7-4) currently states:

"Two Barriers
The first physical barrier is provided by the design of the Cs IX column. The second is the level detection and caustic addition systems, which ensure that the resin is covered before the resin thermally degrades if a leak develops in the column.

Single-Failure Criterion
The barriers ensure that the single-failure criterion is met. A passive failure in the column is backed up by the automatic caustic/water addition system, activated by one of two column level detection systems. The automatic caustic/water addition system will have sufficient redundancy to ensure that no single failure will defeat its safety function."

The proposed amendment would change the text to read:

"Two Barriers
The first physical barrier is provided by the design of the Cs IX column. The second is the level detection and emergency elution system, which ensure that the resin is covered before the resin thermally degrades if a leak develops in the column.

Single-Failure Criterion
The barriers ensure that the single-failure criterion is met. A passive failure in the column is backed up by the emergency elution system, activated by one of two column level detection systems. The emergency elution system will have sufficient redundancy to ensure that no single failure will defeat its safety function."

Evaluation (conditionally acceptable): This change to the PSAR is acceptable contingent on BNI revising the above text as noted below.

"Two Barriers
The first physical barrier is provided by the design of the Cs IX column. The second physical barrier is the C5 confinement system.

Single-Failure Criterion
The emergency elution system is activated by low liquid level and/or high resin bed temperature. The low level and high temperature monitoring systems ensure redundant and diverse detection of the initiating event. The emergency elution system will be provided with sufficient redundancy to ensure no single failure will defeat its safety function."

The amendment as revised is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.9 Proposed Changes to PSAR Volume II, Section 3.4.1.7.1.7 Summary of ITS SSCs and Candidate TSR Controls:

Section 3.4.1.7.1.7(Page 3.4.1.7-5) currently states:

"The ITS SSCs credited for preventing the occurrence of overheating in the Cs IX columns and for meeting defense-in-depth requirements are:

- IX column confinement boundary (SDC)
- Cs IX column liquid level detection instrumentation and interlock (SDC)
- Automatic caustic/water addition system (SDC)"

The proposed amendment would change the text to read:

"The ITS SSCs credited for preventing the occurrence of overheating in the Cs IX columns and for meeting defense-in-depth requirements are

- IX column confinement boundary (SDC)
- Cs IX column liquid level detection instrumentation and interlock (SDC)
- Cs IX column resin temperature monitor and interlock (SDC)
- Emergency elution system (SDC)"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.10 Proposed Changes to PSAR Volume II, Section 3.4.1.7.2.2 Mitigated DBE Scenario:

Section 3.4.1.7.2.2 (Page 3.4.1.7-6) currently states in part:

> "Initial Control Strategy Selection
> The following initial controls were selected as candidates to prevent resin boiling, dryout, and overheating due to a long-term loss of flow (CSD-PCXP/N0016):
>
> - Height of the IX column inlet distributor and other design features that ensure the liquid level does not drop below resin bed height provided passive protection against draining and dry out of the resin.
> - IX column level detection system and interlock
> - Automatic caustic/water addition system"

The proposed amendment would change the text to read:

> "Initial Control Strategy Selection
> The following initial controls were selected as candidates to prevent resin boiling, dryout, and overheating due to a long-term loss of flow (CSD-PCXP/N0016):
>
> - Height of the IX column inlet distributor and other design features that ensure the liquid level does not drop below resin bed height provided passive protection against draining and dry out of the resin.
> - IX column level detection system and interlock
> - IX column resin temperature monitor and interlock
> - Emergency elution system"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

Section 3.4.1.7.2.2 (Page 3.4.1.7-6, third paragraph) currently states in part:

> "Loss of power events lasting from a few minutes to several hundred hours are examined (24590-PTF-Z0C-W14T-00027). Loss of site power for longer than 144 hr has an estimated frequency of 8×10^{-5}/yr. The probability of non-recovery during the expected interval is estimated at 0.23. Facility blackout resulting in inability to use the automatic caustic/water addition system was determined to have a frequency much less than 1×10^{-6}/yr. The ITS level detection and automatic caustic/water addition systems are assigned a failure rate of 5×10^{-3}/demand (24590-PTF-Z0C-W14T-00027). The accident frequency is the product of the frequency of long-term loss of power, times failure to recover power, times the sum of the failure rates for the ITS level detection and automatic caustic/water addition systems:"

The proposed amendment would change the text to read:

> "Loss of power events lasting from a few minutes to several hundred hours are examined (24590-PTF-Z0C-W14T-00027). Loss of site power for longer than 144 hr has an estimated frequency of 8×10^{-5}/yr. The probability of non-recovery during the expected interval is estimated at 0.23. Facility blackout resulting in inability to use the emergency elution system was determined to have a frequency much less than 1×10^{-6}/yr. The ITS level detection and emergency elution systems are assigned a failure rate of 5×10^{-3}/demand (24590-PTF-Z0C-W14T-00027). The accident frequency is the product of the frequency of long-term loss of power, times failure to recover power, times the sum of the failure rates for the ITS level detection and emergency elution systems:"

Evaluation (Conditionally Acceptable): This change to the PSAR is acceptable contingent on BNI deleting the above paragraph and replacing it with the paragraph below:

> "The resin overheating accident is prevented by SDC controls and design features. Self-heating of the resin bed to the pyrolysis or auto-ignition temperatures is considered to be a beyond design basis event (BDBE) because for it to occur a long term loss of power event, namely a site blackout longer than 144 hours would be required.

Revision of this paragraph is acceptable because previously approved ABCN #24590-WTP-ABCN-ESH-02-019 removed the requirement to use target frequencies for selection and confirmation of control strategies.

3.1.11 Proposed Changes to PSAR Volume II, Section 3.4.1.7.2.5 Final Control Strategy Selection:

Section 3.4.1.7.2.5 (Page 3.4.1.7-7) currently states:

> "The ITS SSCs credited in this analysis for preventing boiling/evaporation of column liquids due to a long-term loss of flow are (24590-PTF-Z0C-W14T-00027)
>
> - Height of the inlet distributor and other design features that ensure that the liquid level does not drop below resin bed height, to provide passive protection against draining and dry out of the resin
> - IX column level detection system (including interlock)
> - Automatic caustic/water addition system"

The proposed amendment would change the text to read:

> "The ITS SSCs credited for preventing the occurrence of overheating in the Cs IX columns and for meeting defense-in-depth requirements are:
>
> - Height of the inlet distributor and other design features that ensure that the liquid level does not drop below resin bed height, to provide passive protection against draining and dry out of the resin
> - IX column level detection system (including interlock)

- IX column resin temperature monitor and interlock
- Emergency elution system"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.12 Proposed Changes to PSAR Volume II, Section 3.4.1.7.2.6 Defense in Depth Items:

Section 3.4.1.7.2.6 (Page 3.4.1.7-7, "Two Barriers") currently states in part:

> "The level detection and automatic caustic/water addition systems provide the means for replacing evaporated liquid, although evaporation of the 100 gal buffer layer occurs slowly enough that recovery is expected before the resin is uncovered and dried out."

The proposed amendment would change the text to read:

> "The level detection and emergency elution systems provide the means for replacing evaporated liquid, although evaporation of the 100 gal buffer layer occurs slowly enough that recovery is expected before the resin is uncovered and dried out."

Evaluation (Acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

Section 3.4.1.7.2.6 (Page 3.4.1.7-7, "Target Frequency") currently states in part:

> "Redundancy in the automatic caustic/water addition system and in the emergency power system is not needed for this accident, given the low likelihood of loss of normal power for more than 144 hr."

The proposed amendment would change the text to read:

> "Redundancy in the emergency elution system and in the emergency power system is not needed for this accident, given the low likelihood of loss of normal power for more than 144 hr."

Evaluation (Conditionally Acceptable): This change to the PSAR is acceptable contingent on the deletion of this paragraph in its entirety. Deletion of this paragraph is acceptable because previously approved ABCN #24590-WTP-ABCN-ESH-02-019 removed the requirement to use target frequencies for selection and confirmation of control strategies.

3.1.13 Proposed Changes to PSAR Volume II, Section 3.4.1.7.2.7 Summary of ITS SSCs and Candidate TSR Controls:

Section 3.4.1.7.2.7 (Page 3.4.1.7-8) currently states in part:

"The ITS SSCs credited for preventing the occurrence of overheating the Cs IX columns and for meeting defense in depth requirements are:

- Hydraulic design of the Cs IX column and feed vessel (SDC)
- IX column liquid level detection instrumentation and interlock (SDC)
- Automatic caustic/water addition system (SDC)"

The proposed amendment would change the text to read:

"The ITS SSCs credited for preventing the occurrence of overheating the Cs IX columns and for meeting defense in depth requirements are:

- Hydraulic design of the Cs IX column and feed vessel (SDC)
- IX column liquid level detection instrumentation and interlock (SDC)
- IX column resin temperature monitor and interlock (SDC)
- Emergency elution system (SDC)"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.14 Proposed Changes to PSAR Volume II, Section 3.4.1.7.3 Resin Dryout Due to Loss of Liquid Level Control (Blowdown):

The following administrative and editorial changes not evaluated elsewhere were proposed to Section 3.4.1.7.3 and all subsections:

Section No.	Page No.	Summary of change
3.4.1.7.3 and subsections	3.4.1.7-8 thru 3.4.1.7-11	Replaced all references to the gas separation vessels "(GSV)" and replaced them with "column." Also replaced reference to "automatic cooling/makeup" and "automatic caustic/water addition" to "emergency elution."

Evaluation (Acceptable): The changes above are acceptable because they are administrative or editorial in nature and do not change the requirements contained in the SRD.

3.1.15 Proposed Changes to PSAR Volume II, Section 3.4.1.7.3.5 Final Control Strategy Selection:

Section 3.4.1.7.3.5 (page 3.4.1.7-11) currently states:

"The ITS SSCs credited for preventing the occurrence of a Cs IX column blowdown are column low-level trip circuits, each connected to the column inlet and outlet valves."

The proposed amendment would change the text to read:

"The ITS SSCs credited for preventing the occurrence of a Cs IX column blowdown are column low-level trip circuits, each connected to the column inlet and outlet valves and purge air pressure control, and redundant purge air exhaust pathways."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.16 Proposed Changes to PSAR Volume II, Section 3.4.1.7.3.7 Summary of ITS SSCs and Candidate TSR Controls:

Section 3.4.1.7.3.5 (Page 3.4.1.7-11, first paragraph) currently states:

"The ITS SSCs credited for preventing and mitigating the consequences of the Cs IX column liquid being blown out, and for meeting defense in depth requirements are

- Cs IX column liquid level detection instrumentation and interlock (SDC)
- Cs IX column isolation valves (inlet and outlet valves) (SDC)
- PVP/PVV system filtration (SDC)
- Cell confinement boundary (SDC)
- C5V system; specifically ductwork, exhaust fans, and HEPA filters (SDC)"

The proposed amendment would change the text to read:

"The ITS SSCs credited for preventing and mitigating the consequences of the Cs IX column liquid being blown out, and for meeting defense in depth requirements are

- Cs IX column liquid level detection instrumentation and interlock (SDC)
- Cs IX column isolation valves (inlet and outlet valves) (SDC)
- Purge Air Pressure Control (SDC)
- Redundant purge air exhaust pathways (SDC)
- PVP/PVV system filtration (SDC)
- Cell confinement boundary (SDC)
- C5V system; specifically ductwork, exhaust fans, and HEPA filters (SDC)"

Evaluation (Acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.17 Proposed Changes to PSAR Volume II, Section 3.4.1.8 Hydrogen Explosions:

The following administrative and editorial changes not evaluated elsewhere were proposed to Section 3.4.1.8 and all subsections:

Section No.	Page No.	Summary of change
3.4.1.8 and subsections	3.4.1.8-1 thru 3.4.1.8-15	Replaced all references to the gas separation vessels "(GSV)" and replaced them with "column."

Evaluation (Acceptable): The changes above are acceptable as described above because they are administrative or editorial in nature and do not change the requirements contained in the SRD.

The following changes were not identified as part of the ABAR submittal but should be made at the next scheduled revision of the PSAR:

Section No.	Page No.	Summary of change
3.4.1.8	3.4.1.8-1	Delete reference to calculation 24590-PTF-Z0C-W14T-00026 (second bullet) relating to Hydrogen Accumulation in the Cesium Ion Exchange Column Gas Separation Vessel.
3.4.1.8.4.2	3.4.1.8-14	The second paragraph has two sentences referring to bottled air that should be deleted.

Evaluation (Acceptable): The changes above are acceptable as described above contingent on BNI deleting the references identified above because they are administrative or editorial in nature and do not change the requirements contained in the SRD.

3.1.18 Proposed Changes to PSAR Volume II, Section 3.4.1.8.4.9 Summary of ITS SSCs and Candidate TSR Controls:

Section 3.4.1.8.4.9 (Page 3.4.1.8-15, first paragraph) currently states in part:

> "The ITS SSCs credited for reducing the risks associated with a loss of purge air in a shutdown Cs IX column and for meeting defense-in-depth requirements are
>
> - Cs IX column GSV (SDC)
> - Forced purge air system (air compressors, air supply piping, valving, and monitoring) (SDC)
> - Compressed air bottles (SDC)
> - Passive air inbleed line (SDC)"

The proposed amendment would change the text to read:

> "The ITS SSCs credited for reducing the risks associated with a loss of purge air in a shutdown Cs IX column and for meeting defense-in-depth requirements are
>
> - Cs IX column (SDC)
> - Forced purge air system (air compressors, air supply piping, valving, and monitoring) (SDC)
> - Passive air inbleed line (SDC)"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.19 Proposed Changes to PSAR Volume II, Section 3.4.2.1.2 Seismic vent – Hydrogen Hazards:

The following administrative and editorial changes not evaluated elsewhere were proposed to Section 3.4.2.1.2 and all subsections:

Section No.	Page No.	Summary of change
3.4.2.1.2 and subsections	3.4.2-3 thru 3.4.2-5	Deleted all references to the gas separation vessels "(GSV)."

Evaluation (Acceptable): The changes above are acceptable as described above because they are administrative or editorial in nature and do not change the requirements contained in the SRD.

The following changes were not identified as part of the ABAR submittal but should be made at the next scheduled revision of the PSAR:

Section No.	Page No.	Summary of change
3.4.2.1.2.1	3.4.2-3	The second to last bullet on the page referring to Cs IX Column Gas Separation Vessels should be deleted since the GSVs are no longer part of the system.

Evaluation (Acceptable): The changes above are acceptable as described above contingent on BNI deleting the reference discussed above because they are administrative or editorial in nature and do not change the requirements contained in the SRD.

3.1.20 Proposed Changes to PSAR Volume II, Table 3A-8 PT Risk Reduction Class Items Systems:

Table 3A-8 (Page 3A-12) currently states:

Table 3A-8 PT Risk Reduction Class Items Systems

SSC	RRC Function
Vessels (with hazardous contents and not designated SDC or SDS).	Provide primary confinement of hazardous materials.
Vessel level alarm controls (if not designated SDC or SDS).	Prevent vessel overflow event.
Radiation monitor in process cooling and chilled water lines for process vessels with cooling jackets.	Detect radiation in service lines and signal interlock.
Interlock with radiation monitoring in cooling and chilled water loop isolation valves.	On detection of radiation, automatically stop flow, and actuate isolation valves.
Liners, sumps, sump level detection and alarms, and ejectors.	Collect spill, notification of spill, and provide for returning the facility to a normal condition.
Cs IX column GSV normal level control system.	Detect and notify operators of low levels in the Cs IX columns.
Cs IX column temperature monitoring system.	Detect and notify operators of abnormal Cs IX column temperature for manually initialing the caustic addition system.
Cs IX column feed pump trip interlock.	Prevent overfilling IX columns following a column blowout event.

Table 3A-8 PT Risk Reduction Class Items Systems

Out-cell cranes.	Minimize load and component drops.

The proposed amendment would change Table 3A to read:

Table 3A-8 PT Risk Reduction Class Items Systems

SSC	RRC Function
Vessels (with hazardous contents and not designated SDC or SDS).	Provide primary confinement of hazardous materials.
Vessel level alarm controls (if not designated SDC or SDS).	Prevent vessel overflow event.
Radiation monitor in process cooling and chilled water lines for process vessels with cooling jackets.	Detect radiation in service lines and signal interlock.
Interlock with radiation monitoring in cooling and chilled water loop isolation valves.	On detection of radiation, automatically stop flow and actuate isolation valves.
Liners, sumps, sump level detection and alarms, and ejectors.	Collect spill, notification of spill, and provide for returning the facility to a normal condition.
Cs IX column normal level control system.	Detect and notify operators of low levels in the Cs IX columns.
Out-cell cranes.	Minimize load and component drops.

Evaluation (acceptable): The deletion of the reference to the Cs IX column temperature monitoring system and feed pump trip interlock from Table 3A-8 is acceptable because these features have been upgraded to SDC as described and evaluated in Section 3.1.

3.1.21 Proposed Changes to PSAR Volume II, Chapter 3 Tables, Miscellaneous Administrative and Editorial Changes:

The following administrative and editorial changes not evaluated above were proposed to Tables in Chapter 3:

Table No.	Page No.	Summary of change
3A-13	3A-25	Delete reference to the gas separation vessels (GSV) in the last row.
3A-28	3A-53	Delete reference to the gas separation vessels (GSV) and compressed air bottles.

Evaluation (Acceptable): The changes above are acceptable because it implements the design change as described in Section 3.1.

3.1.22 Proposed Changes to PSAR Volume II, Chapter 4, Miscellaneous Administrative and Editorial Changes:

The following administrative and editorial changes not evaluated elsewhere were proposed to Chapter 4:

Section No.	Page No.	Summary of change
4.3.3	4-8	Delete reference to the gas separation vessel.
4.3.4.2	4-10	Delete reference to the compressed air bottles and gas separation vessels.

4.3.4.3.1	4-11	Delete last paragraph in its entirety that references compressed air bottles and gas separation vessels.
4.3.4.4	4-12	Delete reference to compressed air bottles in bullet number 3.
4.3.4.5	4-12	Delete first sentence of the last paragraph that references the compressed air bottles and gas separation vessels.
4.3.4.6	4-13	Delete fourth bullet reference to the compressed air bottles.

Evaluation (Acceptable): The changes above are acceptable because it implements the design change as described in Section 3.1.

3.1.23 Proposed Changes to PSAR Volume II, Section 4.3.9.2, System Description:

Section 4.3.9.2 (Page 4-20, second paragraph) currently states in part:

> "The Cs IX column liquid level protection system will ensure that the required column liquid level will be maintained under column leak, idle, or loss of liquid level control (blowout) conditions. The system includes
>
> - Column liquid level detection instrumentation
> - Automatic caustic/water addition system interlock
> - Automatic caustic/water addition system
> - Column isolation valve interlock
> - Column feed pump shutdown interlock
> - GSV purge air dump valve interlock"

The proposed amendment would change the text to read:

> "The Cs IX column liquid level protection system will ensure that the required column liquid level will be maintained under column leak, idle, or loss of liquid level control (blowout) conditions. The system includes:
>
> - Column liquid level detection and column resin bed temperature monitoring instrumentation
> - Emergency elution system interlock
> - Emergency elution system (including vessels, piping, valves, instrumentation)
> - Column isolation valve interlock
> - Column feed pump shutdown interlock
> - Column hydrogen purge control system
> - Redundant hydrogen purge exhaust paths"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.24 Proposed Changes to PSAR Volume II, Section 4.3.9.3, Functional Requirements:

Section 4.3.9.3 (Page 4-21) currently states:

"To ensure that the Cs IX column liquid level protection system performs its credited safety function, the following functional requirements must be met:

- On detection of low liquid level in an IX column (level below the column top), the column liquid level detection and interlock must
  - Initiate the automatic caustic/water addition system
  - Close the column outlet valve and ensure the inlet valve remains open
  - Shut off the IX column feed pump
  - Shut the GSV purge valve
  - Open the purge air dump valve(s) on the vent outlets from the GSVs
- The system must be provided with SDC UPS power as necessary to perform its safety function upon a loss of normal power.
  The system design satisfies the single-failure criterion. The Cs IX column liquid level protection system has a seismic safety function, is designated SC-I and must meet SRD Safety Criteria 4.1-2, 4.1-4, 4.1-5, 4.3-1, through 4.3-5, 4.4-2, 4.4-4, and 4.4-10. SDC SSCs must meet QL-1 requirements."

The proposed amendment would change the text to read:

"To ensure that the Cs IX column liquid level protection system performs its credited safety function, the following functional requirements must be met:

- On detection of low liquid level in an IX column or high temperature in the column resin bed, the liquid level or resin bed temperature interlock must
  - Initiate the emergency elution system
  - Close the column inlet and outlet valves or shut off the IX column feed pump
- On initiation of the emergency elution system, the fresh resin addition valve at the outlet of CRP-VSL-00001 must close.
- On detection of low liquid level in an IX column (level below the column top), the column hydrogen purge control system must default to a low pressure state.
- The emergency elution system vessels, piping, and valves must provide an open flow path to the resin bed for caustic solutions, demineralized water, and elution acid.
- The redundant hydrogen purge exhaust system must maintain an open flow path.
- The system must be provided with SDC UPS power as necessary to perform its safety function upon a loss of normal power.

The system design must satisfy the single-failure criterion. The Cs IX column liquid level protection system has a seismic safety function, is designated SC-I, and must meet SRD Safety Criteria 4.1-2, 4.1-4, 4.1-5, 4.3-1 through 4.3-5, 4.4-2, 4.4-4, and 4.4-10. SDC SSCs must meet QL-1 requirements.

The functional requirements applicable to the emergency elution vessels, piping, and valves are specified in Sections 4.3.3.3 and 4.3.5.3. The functional requirements applicable to the column hydrogen purge control system are specified in Section 4.3.4.3."

Evaluation (Conditionally Acceptable): This change to the PSAR is acceptable contingent on BNI revising the first bullet (second dash) to read:

"- Close the IX column feed pump discharge valve"

This is acceptable because it implements the design change as described and evaluated in Section 3.1 and ABAR 24590-WTP-ABAR-ENS-03-378.

3.1.25 Proposed Changes to PSAR Volume II, Section 4.3.9.4, Standards:

Section 4.3.9.4 (Page 4-21) currently states:

"The following standards apply to the Cs IX column liquid level protection system:

- The level protection system will be designed and constructed in accordance with ISA S84.01, IEEE 338, IEEE 344, IEEE 379, IEEE 384, and IEEE 1023.

The rationale for selecting ISA S84.01 and the IEEE standards is provided in Section 4.3.2.4.

The proposed amendment would change the text to read:

"The following standards apply to the Cs IX column liquid level protection system:

- The level protection system will be designed and constructed in accordance with ISA S84.01, IEEE 338, IEEE 344, IEEE 379, IEEE 384, and IEEE 1023.

The rationale for selecting ISA S84.01 and the IEEE standards is provided in section 4.3.2.4.

The standards applicable to the emergency elution vessels, piping, and valves are specified in sections 4.3.3.4 and 4.3.5.4. The standards applicable to the column hydrogen purge control system are specified in section 4.3.4.4."

Evaluation (acceptable): This change to the PSAR is acceptable because the standards invoked in Sections 4.3.3.4, 4.3.4.4, and 4.3.5.4 are consistent with standards identified in the SRD.

3.1.26 Proposed Changes to PSAR Volume II, Section 4.3.9.5, System Evaluation:

Section 4.3.9.5 (Page 4-22) currently states in part:

"The Cs IX liquid level instrumentation and controls interlocks will be designed using the cited standards to ensure the reliability of the safety system to perform the necessary functions of detecting low level. Instrumentation will initiate the automatic caustic/water addition system to add makeup fluids for increasing the level to safely cover the resin. The low level detection interlock also will shut the column outlet isolation valve, maintain the inlet isolation valve open, stop the column feed pump, open the purge air dump valves on the vent outlet from the gas separation vessels, and close the forced purge air inlet valves. This level control system of interlocks will protect resin, potentially loaded with Cs, from heating

to the point of thermal degradation or autoignition. The SDC UPS power is designed to the cited IEEE standards to ensure the reliability of the level instrumentation detection system."

The proposed amendment would change the text to read:

"The Cs IX liquid level and resin bed temperature instrumentation and controls interlocks will be designed using the cited standards to ensure the reliability of the safety system to perform the necessary functions of detecting low level or high resin temperature. This instrumentation will initiate the emergency elution system to elute the resin of ^{137}Cs. The Cs fresh resin air gap vessel level detection will indicate that elution reagents are reaching the IX columns.

The interlocks also will shut the column inlet and outlet isolation valves, or close the column feed pump isolation valves. The low-level detection interlock also initiates a column pressure reduction by the hydrogen purge control system to ensure the addition of the emergency elution chemicals."

Evaluation (Conditionally Acceptable): This change to the PSAR is acceptable contingent on BNI revising the second paragraph above to read:

"The interlocks also will close the column feed pump discharge isolation valve. The low-level detection interlock also initiates a column pressure reduction by the hydrogen purge control system to ensure the addition of the emergency elution chemicals."

This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.27 Proposed Changes to PSAR Volume II, Chapter 4 Tables, Miscellaneous Administrative and Editorial Changes:

The following administrative and editorial changes not evaluated above were proposed to Tables in Chapter 4:

Table No.	Page No.	Summary of change
4A-1	4A-2	Delete second row reference to the compressed air bottles.

Evaluation (Acceptable): The changes above are acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.28 Proposed Changes to PSAR Volume II, Section 5.5.6, Limiting Condition for Operation – Hydrogen Mitigation Purge and Mixing Systems Operability:

Section 5.5.6 (Page 5-9, third paragraph, second sentence) currently states in part:

"The headspace air purge sweeps the hydrogen out of the headspace."

The proposed amendment would change the text to read:

"The headspace air purge sweeps the hydrogen out of the headspace of vessels and the Cs IX columns."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

Section 5.5.6 (Page 5-9, seventh paragraph) currently states in part:

"For those vessels and cesium ion exchange columns identified in section 4.3.4 as requiring purging, the following additional TSR operability requirements apply:

- The headspace purge systems shall have power from the PT facility SDC UPS system.
- The headspace purge flow monitoring and control system instrumentation shall be operable, providing a remote alarm in the PT facility control room.
- Compressed air bottles must provide sufficient air to purge the gas separation vessels connected to the Cs IX columns for 8 hr following a loss of electrical power."

The proposed amendment would change the text to read:

"For those vessels and cesium ion exchange columns identified in Section 4.3.4 as requiring purging, the following additional TSR operability requirements apply:

- The headspace purge systems shall have power from the PT facility SDC UPS system.
- The headspace purge flow monitoring and control system instrumentation shall be operable, providing a remote alarm in the PT facility control room."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

Section 5.5.6 (Page 5-10):

The second to last bullet on periodic verification of compressed air bottle pressure should be deleted since the compressed air bottles are no longer part of the system.

Evaluation (Acceptable): This change is acceptable contingent on BNI deleting reference to the compressed air bottles as referenced above because it is administrative or editorial in nature and is consistent with the changes described and evaluated in Section 3.1.

3.1.29 Proposed Changes to PSAR Volume II, Section 5.5.9, Limiting Condition for Operation – Cesium Ion Exchange Column Liquid Level Protection Systems Operability:

Section 5.5.9 (Page 5-12, first six bullets) state:

"A level detection system in the Cs IX column detects low Cs IX column levels, and initiates the following interlock functions:

- Closure of the outlet isolation valve
- Maintain the inlet isolation valve open
- Trip of the Cs IX column feed pump
- Shut the gas separation vessel air purge valve
- Open the purge air dump valve(s) on the vent outlets from the gas separation vessels
- Initiation of the gravity-fed automatic caustic/water addition system.

The proposed amendment would change the text to read:

"A Cs IX column liquid level detection system and a column resin bed temperature monitoring system initiates the following interlock functions on detecting low liquid level or high temperature in the resin bed:

- Initiation of the emergency elution system
- Closure of the IX column feed pump discharge valve
- On initiation of the emergency elution system, the fresh resin addition valve at the outlet of CRP-VSL-00001 must close

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

Section 5.5.9 (Page 5-12, third paragraph, second sentence) currently states in part:

> "The Cs IX column level protection systems TSR operability requirements include the following elements:
>
> - The column liquid level detection instrumentation shall be operable, detecting column liquid levels below a predetermined value.
> - The inlet and outlet isolation valve interlocks shall be operable, moving the valves to the proper position upon receiving a signal from the detection instrumentation.
> - The gas separation vessel air purge valve interlock shall be operable, moving the valve to the proper position upon receiving a signal from the detection instrumentation.
> - The gas separation vessel vent outlet dump valve(s) interlock shall be operable, opening the valve upon receiving a signal from the detection instrumentation.
> - The automatic caustic/water addition interlock shall be operable, adding a caustic/water solution to the column upon receiving a signal from the detection instrumentation.
> - A minimum level is maintained in the reagent tanks to support the automatic caustic/water addition.
> - The level detection and interlock components shall have a PT facility SDC UPS.
>
> The proposed amendment would change the text to read:

"The Cs IX column level protection systems TSR operability requirements include the following elements:

- The column liquid level detection instrumentation shall be operable, detecting column liquid levels below a predetermined value.
- The column resin bed temperature monitoring instrumentation shall be operable, detecting column resin temperature above a predetermined value.
- The inlet and outlet isolation valve interlocks shall be operable, moving the valves to the proper position upon receiving a signal from the detection instrumentation.
- The Cs fresh resin air gap vessel level detection system shall be operable, indicating elution reagents are reaching the IX columns.
- The Cs IX feed pump shutdown interlock shall be operable, tripping the pump upon receiving a signal from the detection instrumentation.
- The automatic emergency elution interlock shall be operable, adding and removing a caustic solution, demineralized water, and nitric acid to the column in sequential order upon receiving a signal from the detection instrumentation.
- The fresh resin addition outlet valve and interlock shall be operable.
- The column hydrogen purge control system interlock shall be operable, reducing column pressure upon receiving a signal from the level detection instrumentation.
- Minimum levels are maintained in the reagent tanks to support the automatic emergency elution system.
- The level detection and interlock components shall be provided power from a PT facility SDC UPS.

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

Section 5.5.9 (Page 5-12) currently states in part:

Surveillances related to this LCO include the following elements:

- Periodic verification that sufficient levels exist in the sodium hydroxide head tank/demineralized water head tank to perform the automatic caustic/water addition
- Periodic functional tests of the automatic caustic/water addition interlock
- Periodic functional tests of the inlet and outlet isolation valve interlocks
- Periodic functional tests of the gas separation vessel air purge valve interlocks
- Periodic functional tests of the gas separation vessel vent outlet dump valve(s) interlocks
- Periodic instrument loop calibrations of the level detection instrumentation"

The proposed amendment would change the text to read:

"Surveillances related to this LCO include the following elements:

- Periodic verification that sufficient levels exist in the reagent head tanks to perform emergency elution
- Periodic functional tests of the emergency elution interlock

- Periodic functional tests of the fresh resin addition outlet valve and interlock.
- Periodic functional tests of the inlet and outlet isolation valve interlocks
- Periodic functional tests of the Cs IX feed pump shutdown interlock
- Periodic functional tests of the column hydrogen purge system low pressure interlock
- Periodic instrument loop calibrations of the level detection and temperature monitoring instrumentation."

Evaluation (Conditionally Acceptable): This change to the PSAR is acceptable contingent on BNI revising the fifth bullet to read as follows:

- "Periodic functional tests of Cs IX feed pump discharge valve interlock "

Evaluation (Acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

4.0 CONCLUSION

On the basis of the considerations described above, the ORP has concluded the proposed change does not create a new DBE or increase the frequency or consequences of the analyzed DBE. ORP also has concluded there is reasonable assurance that the health and safety of the public, the workers and the environment will not be adversely affected by the changes proposed by ABAR 24590-WTP-SE-ENS-03-308. The proposed changes to PTF PSAR Sections 2.5.6, 2.5.6.2, 2.7.1, 3.3.3.2.4, 3.4.1.7, 3.4.1.8, 3.4.2.1, Table 3A-8, Table 3A-13, Table 3A-28, Section 4.3.3, 4.3.4, 4.3.9, Table 4A-1, Section 5.5.6, and 5.5.9 do not alter compliance with applicable laws and regulations, maintains conformance with top-level standards (i.e., DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*) and do not constitute a significant reduction in commitment or effectiveness relative to the design, construction, and operation of the Cesium Ion Exchange Process System. Accordingly, the proposed changes are acceptable and the ORP approves the amendments as proposed in ABAR 24590-WTP-SE-ENS-03-308, Revision 0, with eight required modifications described in Sections 3.3.3.2.4, 3.4.1.7.1.5, 3.4.1.7.4, 3.4.1.7.2.2, 3.4.1.7.2.6, 4.3.9.3, 4.3.9.5, and 5.5.9 of this Safety Evaluation Report.

**Safety Evaluation Report (SER)
of Proposed Authorization Basis Amendment Request (ABAR)
24590-WTP-SE-ENS-03-378, Rev. 1
Process Flow Diagram: Cesium Resin Addition Process System (CRP)
for the River Protection Project Waste Treatment and Immobilization Plant (WTP)**

1.0 INTRODUCTION

This SER documents the U.S. Department of Energy, Office of River Protection (ORP) evaluation of changes proposed by Bechtel National, Inc. (the Contractor) concerning in part revisions to the Cesium Resin Addition Process (CRP) process flow diagram (PFD) 24590-PTF-M5-V17T-00018. By letter dated September 5, 2003,[1] and October 13, 2003,[2] the Contractor submitted changes that proposed principally to change the Pretreatment Facility's (PTF) cesium ion exchange columns from emergency cooling to emergency elution. Other changes were submitted that were required as part of this change and were evaluated as well.

The ABAR 24590-WTP-SE-ENS-03-378 submitted to ORP by the Contractor proposes the following:

1. The Resin Addition Fines Receipt Tank, CRP-TK-00001, and the Cesium Resin Addition Vacuum Blower, CRP-BLWR-0000 1, were deleted from the design.
2. The Cesium Resin Addition Vessel Inlet Hopper, CRP-HPR-00001, was deleted from the design.
3. A Reusable Resin Addition Container was added to the design, for use in lieu of the flexible connection to the resin drums. (Subsequently, it was renamed as Fresh Resin Shipping Container in Rev. 1; see Item 12 below.)
4. A 2M sodium hydroxide feed line and a 0.5 molar nitric acid feed line were added to the CRP system, with connection to the Cesium Resin Addition Vessel, CRP-VSL-00001.
5. A flow control valve was added underneath the Cesium Resin Addition Vessel, CRP-VSL-00001, for controlling the flow to the Cesium Resin Addition Air Gap Vessel, CRP-VSL-00002.
6. The overflow destination of the Cesium Resin Addition Air Gap Vessel, CRP-VSL-00002, was changed from vessel RDP-VSL-00002-B to vessel RDP-VSL-00002-A/-B/-C. (Subsequently, it was again changed from RDP-VSL-00002-A/-B/-C to RDP-VSL-00002-A. See Item 9 below.)
7. The source for supply of 0.5 molar nitric acid was changed from 0.5 M Nitric Acid Head Tank, NAR-TK-0007, to a direct supply from the BOF. The demineralized water supply line for the Cesium Resin Addition Vessel, CRP-VSL-00001, was moved from the suction of the pump, CRP-PMP-00001, to the top of vessel CRP-VSL- 00001.

[1] BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-378, Revision 0, 'Process Flow Diagram: Cesium Resin Addition Process System (CRP)'," CCN: 066507, dated September 5, 2003.
[2] BNI letter from J. P. Henschel to R. J. Schepens, ORP, "Re-Transmittal for Approval: Authorization Basis Amendment Request 24590-WTP-SE-ENS-03-378, Revision 1, 'Process Flow Diagram: Cesium Resin Addition Process System (CRP)'," CCN: 070434, dated October 13, 2003.

8. The destination of the CRP spent reagents was changed from the C2 Floor Drain Collection Vessel, PWD-VSL- 00045, in the PWD system to the Alkaline Effluent Vessels, RLD-VSL-00017-Am, in the RLD system.
9. The overflow pathway (3-way valves, piping, and isolation valves) from vessel CRP-VSL-00002 to vessels RDP-VSL-00002-B/-C was eliminated, leaving only one overflow pathway to RDP-VSL-00002-A.
10. New feed lines were added from the three tanks, DIW-TK-00001, NAR-TK-00007, and SHR-TK-0000l (0.1 M NaOH Head Tank), to the Cesium Resin Addition Air Gap Vessel, CRP-VSL-00002. These lines will have SDC flow instruments (including flow totalizers), flow control valves or flow limiting devices, solenoid valves, and any other necessary equipment. All valves between vessel CRP-VSL-00002 and the CXP System IX-columns will be upgraded to SDC. The valves will allow for manual opening and closing.
11. The demineralized water flush, located beneath the flow control valve (FV-0142), was moved to a location above the flow control valve.
12. The name of the Reusable Resin Addition Container was changed to Fresh Resin Shipping Container.
13. The following editorial changes were made in the drawing area about the vessel CRP-VSL-00002, to incorporate certain editorial design. (See Item 10 above.) The PDI instrument-for measuring the pressure drop across the demister symbol was moved from the side of the breakpot to its right side. The LI instrument symbol and the resin slurry stream line was moved up to the left side. The emergency elution reagents were shown to enter the Cesium Resin Addition Air Gap Vessel, CRP-VSL-00002, below the resin slurry stream. Since the PDI instrument was moved to the right side of the instrument, the overflow line was moved down slightly. The drawing text associated with the overflow line was also moved from a location beside the overflow arrow to underneath the overflow arrow. These text changes forced the tag 'CRP-VSL-00002' to be moved from the right side of this vessel (CW-VSL-00002) to the left side.
14. Note 9 was added to the drawing (PFD). It lists all the approved design changes that were incorporated from Rev. 0 to Rev. 1. The stream number CRPO8 was added to the (as-received) fresh resin stream located in cell F6.
15. The stream number is defined in the document 24590-WTP-RPT-PR-01-008, Rev. 3, Process Stream Numbers. It was inadvertently omitted from the Rev. 0 PFD.

The change to use emergency elution rather than emergency cooling (item 10) is the only change that affects the function and process reliability of SSCs described in the PSAR and as such is the only listed change evaluated.

2.0 BACKGROUND

The WTP authorization basis is the composite of information provided by a Contractor in response to radiological, nuclear, and process safety requirements that is the basis on which the ORP grants permission to perform regulated activities. The authorization basis includes that information requested by the Contractor for inclusion in the authorization basis and subsequently accepted by the ORP. The PSAR describes the analyzed safety basis for those facilities (safety envelope), demonstrates that the facility will perform and be operated such that the radiological,

nuclear, and process safety requirements are met, and demonstrates adequate protection of the public, workers, and environment.

The PSAR is based on the preliminary design of the facilities and is part of the authorization basis for WTP construction. ORP authorized construction of the PTF building based on the facility safety basis documented in the PSAR. By letter CCN-066507[3] and CCN-070434,[4] the Contractor submitted a proposed amendment that required changes to the PTF PSAR. This SER documents ORP's evaluation of the changes proposed in ABAR 24590-WTP-SE-ENS-03-378, Rev. 0, Process Flow Diagram: Cesium Resin Addition Process System (CRP).

3.0 EVALUATION

The following subsections outline specific changes to the Contractor's design drawings and the PSAR with respect to changing the PTF cesium ion exchange columns from emergency cooling to emergency elution along with other system changes that support this change. The reviewers evaluated the drawing 24590-PTF-M5-V17T-00018, Rev 0 and Rev 1, and PSAR Sections 2.4.17.1, 2.5.6, 2.5.6.3, 2.9.10, 3.4.1.7.1.2, and 4.3.9.3; and the Contractor responses to PTF-PSAR Questions 025, 066, and for the changes proposed by ABAR 24590-WTP-SE-ENS-03-378.

3.1 Proposed Changes to PTF PSAR Volume II

The following subsections outline specific changes to the PTF PSAR Specific Information with respect to changes to the Cesium Resin Addition Process (CRP). The change to the CRP system principally changes the Pretreatment Facility's cesium ion exchange columns from emergency cooling to emergency elution, other changes as a result of this change are also evaluated.

Background:

The design changes listed in item 10 of the introduction constitute the replacement of the emergency cooling process system with an emergency elution process system for dealing with the safety aspects of Cesium-137 decay heat during off normal events and as such alter the location, function, and process reliability of SSCs described in the PSAR. The emergency elution system is designed for the prevention of resin dry-out and potential auto-ignition and fire, during off-normal events or emergencies.

Replacement of Emergency Cooling with Emergency Elution

The new emergency elution system consists of the addition of new feed lines from three tanks, DIW-TK-00001, NAR-TIC-00007, and SHR-TK-0000l (0.1 M NaOH Head Tank), to the Cesium Resin Addition Air Gap Vessel, CRP-VSL-00002. These lines will have SDC flow instruments, flow control valves or flow limiting devices, and solenoid valves.

[3] Ibid 1.
[4] Ibid 2.

Evaluation:

This change is acceptable because it does not create a new DBE or increase the consequence of currently analyzed DBEs related to the Cesium Ion Exchange system. DBE calculation 24590-PTF-Z0C-W14T-00027 that addresses a CIX column leak was evaluated. When activated by low level indication or high temperature, the emergency elution system, like the emergency cooling system, initially re-submerges the resin bed with caustic solution. However emergency elution then rinses the resin bed with de-mineralized water, to minimize heat of dilution on addition of elution acid, and adds 0.5 molar nitric acid to remove the radioactive cesium from the resin media. This design feature was not attainable with the emergency cooling process system. The cesium will be removed and piped to the Cesium Nitric Acid Recovery System where the nitric acid will be reclaimed and the cesium transported to the HLW feed. The proposed design is further acceptable because it does not create any new DBEs or adversely affect any DBE currently identified in the PSAR. All valves between vessel CRP-VSL-00002 and the CXP System IX-columns will be SDC and SC-I, and the system design will meet single-failure criterion. All other change items identified in the introduction do not alter the location, function, and process reliability of SSCs described in the PSAR and either do not have any impact to the PSAR or are editorial in nature. New instrumentation and control interlocks have been added that initiate emergency elution on low column level or high resin temperature and have been evaluated in ABAR 24590-WTP-SE-ENS-03-308 and found acceptable. The changes as described will continue to meet SRD Safety Criteria 4.1-1, 4.1-2, 4.1-4, 4.1-5, 4.3-1, 4.3-2, 4.3-3, 4.3-4, 4.4-1, 4.4-2, and 4.5-10, including their implementing codes and standards.

3.1.1 Proposed Changes to PSAR Volume II, Section 2.4.17.1 Cs IX Emergency Elution Room (P-510)

Section 2.4.17.1, (page 2-29) currently states:

> "The Cs IX emergency elution room will contain the dilute nitric acid head tank (NAR-TK-00007) and the dilute sodium hydroxide head tank (SHR-TK-00001) that support Cs IX column emergency elution."

The proposed amendment would change the text to read:

> "The Cs IX emergency elution room will contain the dilute nitric acid head tank (NAR-TK-00007), the dilute sodium hydroxide head tank (SHR-TK-00001) and the demineralized water head tank (DIW-TK-00001) that support Cs IX column emergency elution."

Evaluation (acceptable): The proposed design change replaces emergency cooling to the cesium ion exchange columns with emergency elution. The change as described will continue to meet SRD Safety Criteria 4.1-1, 4.1-2, 4.1-4, 4.1-5, 4.3-1, 4.3-2, 4.3-3, 4.3-4, 4.4-1, 4.4-2, and 4.5-10, including their implementing codes and standards.

The proposed changes to section PSAR Section 2.4.17.1 are acceptable because they are consistent with the design change as evaluated above.

3.1.2 Proposed Changes to PSAR Volume II, Section 2.5.6 Cesium Ion Exchange Process System (CXP)

Section 2.5.6 (page 2-42, paragraph 4, sentence 2) currently states in part:

> "Related equipment includes the emergency cooling source vessels (DIW-TK-00001 and SHR-TK-00005) which maintain a minimum heel to provide emergency cooling supply for the IX system."

The proposed amendment would change the text as found in new paragraph 2.5.7 to read:

> "Related equipment includes the emergency elution source vessels (DIW-TK-00001, NAR-TK-00007, and SHR-TK-00001) which maintain a minimum heel to provide an emergency elution supply for the IX system."

Evaluation (acceptable): The proposed design change replaces emergency cooling to the cesium ion exchange columns with emergency elution. This change is acceptable because it adds the requirement for the nitric acid tank required by the elution process. The cooling and elution source vessel volumes are acceptable consistent with DBE calculation 24590-PTF-Z0C-W14T-00027.

The change as described will continue to meet SRD Safety Criteria 4.1-1, 4.1-2, 4.1-3, 4.3-1, 4.3-2, 4.3-4, 4.4-1, 4.4-2, 4.5-10, including their implementing codes and standards.

The proposed changes to new PSAR Section 2.5.7 are acceptable because they are consistent with the design change as evaluated in Section 3.1.

3.1.3 Proposed Changes to PSAR Volume II, Section 2.5.6.3 Cesium Ion Exchange Reagent Vessel (CXP-VSL-00005)

Section 2.5.6.3 (page 2-43, paragraph 1, last sentence) currently states in part:

> "Controls are provided to ensure that liquids do not drain from the column and as a backup, emergency elution and/or application of water is provided that will operate even in the event of an extended power outage."

The proposed amendment would change the text to read:

> "Controls are provided to ensure that liquids do not drain from the column and as a backup, emergency elution is provided that will operate even in the event of an extended power outage."

Evaluation (acceptable): The proposed design change replaces emergency cooling to the cesium ion exchange columns with emergency elution. New instrumentation and controls have been

added to close the column outlet isolation valve and has been found acceptable based on evaluation 24590-WTP-SE-ENS-03-308. The UPS backed control system and redundant temperature and level instrumentation insure single failure criteria are met.

The change as described will continue to meet SRD Safety Criteria 4.1-1, 4.1-2, 4.1-3, 4.3-1, 4.3-2, 4.3-4, 4.4-1, 4.4-2, 4.5-10, including their implementing codes and standards.

The proposed changes to new PSAR Section 2.5.7 are acceptable because they are consistent with the design change as described in Section 3.1.

3.1.4 Proposed Changes to PSAR Volume II, Section 2.9.10 Reagent Systems:

Section 2.9.10 (page 2-85, first bullet, last sentence) currently states in part:

> "Section 4.3.14.2 describes measures to detect an inadvertent transfer of concentrated nitric acid to the dilute nitric acid head tank (NAR-TK-00007)."

The proposed amendment would change the text to read:

> "Section 4.3.14.2 describes measures to detect an inadvertent transfer of concentrated nitric acid to the 0.5 Molar Nitric Acid Head Tank (NAR-TK-00007)."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1. Measures for detection of an inadvertent transfer of nitric acid solution have not changed. The use of 0.5 molar nitric acid solution is acceptable because it is consistent with the elution process requirements.

3.1.5 Proposed Changes to PSAR Volume II, Section 3.4.1.7.1.2 Mitigated DBE Scenario:

Section 3.4.1.7.1.2 (page 3.4.1.7-3, first paragraph, item 2) currently states in part:

> "Accident Progression 2: Pre-existing leak, column shutdown for an extended time, leak detected, but emergency cooling or heat removal not accomplished due to failure of automatic caustic/water addition system."

The proposed amendment would change the text to read:

> "Accident Progression 2: Pre-existing leak, column shutdown for an extended time, leak detected, but emergency elution or heat removal not accomplished due to failure of the emergency elution system."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

3.1.6 Proposed Changes to PSAR Volume II, Section 4.3.9.3 Functional Requirements:

Section 4.3.9.3 (page 4-21, first bullet, first dash) currently states:

" - Initiate the automatic caustic/water addition system

The proposed amendment would change the text to read:

" - Initiate the emergency elution system"

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

Section 4.3.9.3 (page 4-21, second bullet) currently states:

> "The system must be provided with SDC UPS power as necessary to perform its safety function upon a loss of normal power."

The proposed amendment would change the text to read:

> "The system must be provided with SDC emergency diesel power as necessary to perform its safety function upon a loss of normal power."

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1. Because of the uncertain time duration the ion exchange column would be required maintained in a safe state, the emergency elution system is provided with emergency diesel power as necessary and as evaluated in 24590-WTP-SE-ENS-03-308.

Section 4.3.9.3 (page 4-21, last paragraph) currently states:

> "The system design satisfies the single-failure criterion. The Cs IX column liquid level protection system has a seismic safety function, is designated SC-I and must meet SRD Safety Criteria 4.1-2, 4.1-4, 4.1-5, 4.3-1 through 4.3-5, 4.4-2, 4.4-4, and 4.4-10. SDC SSCs must meet QL-1 requirements."

The proposed amendment would change the text to read:

> "The system design satisfies the single-failure criterion. The Cs IX column liquid level protection system has a seismic safety function, is designated SC-I and must meet SRD Safety Criteria 4.1-2, 4.1-4, 4.1-5, 4.3-1 through 4.3-5, 4.4-2, 4.4-4, and 4.4-10. The Demineralized Water Head Tank (DIW-TK-00001), the 0.5 M Nitric Acid Head Tank (NAR-TK-00007), and the Cesium Resin Addition Air Gap Vessel (CRP-VSL-00002) are part of the emergency elution process, and are designated SDC and SC-1. All piping between the emergency elution reagent tanks (SHR-TK-00001, DIW-TK-00001, and NAR-TK-00007) and the Cesium Ion Exchange Columns are designated SDC and SC-1. This piping has SDC flow instrumentation and valves. SDC SSCs must meet QL-1 requirements.

Evaluation (acceptable): This change to the PSAR is acceptable because it implements the design change as described and evaluated in Section 3.1.

4.0 CONCLUSION

On the basis of the considerations described above, the ORP has concluded the proposed change does not create a new DBE or increase the frequency or consequences of the analyzed DBE. ORP also has concluded there is reasonable assurance that the health and safety of the public, the workers and the environment will not be adversely affected by the changes proposed by ABAR 24590-WTP-ABAR-ENS-03-378. The proposed changes to PT PSAR Sections 2.4.17.1, 2.5.6, 2.5.6.3, 2.9.10, 3.4.1.7.1.2, and 4.3.9.3 do not do not alter compliance with applicable laws and regulations, maintains conformance with top-level standards (i.e., DOE/RL-96-0006, *Top-Level Radiological, Nuclear, and Process Safety Standards and Principles for the RPP Waste Treatment Plant Contractor*) and do not constitute a significant reduction in commitment or effectiveness relative to the design, construction, and operation of the Cesium Ion Exchange Process System. Accordingly, the proposed changes are acceptable and the ORP approves the amendments as proposed in ABAR 24590-WTP-ABAR-ENS-03-378, Revision 0, and Revision 1with no conditions.